

1 Exercise to support indigenous pregnant women to stop smoking: Acceptability to Māori.

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8 Maternal and Child Health Journal - In press 2017

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Abstract

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Objectives

Smoking during pregnancy is harmful for the woman and the unborn child, and the harms raise risks for the child going forward. Indigenous women often have higher rates of smoking prevalence than non-indigenous. Exercise has been proposed as a strategy to help pregnant smokers to quit. Māori (New Zealand Indigenous) women have high rates of physical activity suggesting that an exercise programme to aid quitting could be an attractive initiative. This study explored attitudes towards an exercise programme to aid smoking cessation for Māori pregnant women.

Methods

Focus groups with Māori pregnant women, and key stakeholder interviews were conducted.

Results

Overall, participants were supportive of the idea of a physical activity programme for pregnant Māori smokers to aid smoking cessation. The principal, over-arching finding, consistent across all participants, was the critical need for a Kaupapa Māori approach (designed and run by Māori, for Māori people) for successful programme delivery, whereby Māori cultural values are respected and infused throughout all aspects of the programme. A number of practical and environmental barriers to attendance were raised including: cost, the timing of the programme, accessibility, transport, and childcare considerations.

Conclusions

A feasibility study is needed to design an intervention following the suggestions presented in this paper with effort given to minimising the negative impact of barriers to attendance.

Introduction

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Smoking during pregnancy is harmful to the pregnant woman, the child before birth, post-natally and later in life (Glover et al., 2010). Smoking is the single most modifiable risk factor during pregnancy, associated with increased risk of miscarriage and stillbirth, low birth weight (Castles, Adams, Melvin, Kelsch, & Boulton, 1999; West, 2002), premature birth (Buchan, 1983), stillbirth (Salihi et al., 2008), retarded foetal growth (Jaddoe et al., 2007), sudden unexpected deaths in infancy (Mitchell & Clements, 1997), and infant respiratory infection (Haberg, Stigum, Nystad, & Nafstad, 2007). Smoking also presents immediate risks for pregnant women, including abruptio placentae (Ananth, Smulian, Demissie, Vintzileos, & Knuppel, 2001; Toivonen, Heinonen, Anttila, Kosma, & Saarikoski, 2002), and the longer term risks reported for smokers in general (U.S. Department of Health and Human Services, 2008, 2010). Children of women who smoke while pregnant are at increased risk of neo-natal mortality, learning difficulties in childhood, problem behaviour, asthma, childhood obesity, childhood cancer, and cardiovascular disease (Ayer et al., 2011; Batstra, 2003; Buka, Shenassa, & Niaura, 2003; Charlton, 1996; Royal College of Physicians, 1992; Stjernfeldt, Lindsten, Berglund, & Ludvigsson, 1986; Wideroe, Vik, Jacobsen, & Bakketeig, 2003). Although a major public health concern, and despite the known risk, an increasing number of women in low to middle income countries smoke during pregnancy (Chamberlain C, 2013; Lumley et al., 2009). Internationally, only around 25% of pregnant smokers stop for even part of their pregnancy and, of those women who stop smoking, 66% re-start postnatally (Owen & Penn, 1999).

In New Zealand, Māori (indigenous) women have a higher smoking prevalence during pregnancy compared to non-Māori (34% compared to 11%) (Morton et al., 2010), which is consistent with indigenous women in countries who suffer a similar history of colonization (Heaman & Chalmers, 2005; Kim, England, Dietz, Morrow, & Perham-Hester, 2010; Wright & Tam, 2010). Māori pregnant smokers do however try to stop early and repeatedly, but with poor success rates (Glover & Kira, 2011). Pragmatic effective interventions that are attractive and accessible to pregnant Māori women are urgently needed. Psychosocial interventions can help women stop smoking while pregnant. What is not known is which interventions work best (Chamberlain et al., 2013).

Exercise is likely to be a potentially effective and popular adjunct to behavioural support for smoking cessation during pregnancy, as it may represent an attractive aid to smoking cessation for those women who are reluctant to use nicotine replacement therapy (NRT), and those women who fear post-cessation weight gain (Pomerleau, Brouwer, & Jones, 2000). Two pilot studies to assess the feasibility of using exercise for smoking cessation in pregnancy have been conducted in the United Kingdom (UK) (Ussher et al., 2008). In the first study, 10 women attended six weekly sessions

1 combining individual behavioural support for smoking cessation with 30 minutes of brisk walking
2 and activity counselling. In the second pilot, 22 women received seven sessions of individual smoking
3 cessation support plus 14 sessions of supervised exercise (brisk treadmill walking or stationary
4 cycling) and physical activity counselling. When both pilot studies were considered together, 25%
5 (8/32) of the women demonstrated continuous (carbon monoxide validated) abstinence from
6 smoking to the end of their pregnancy (5/10 in Study 1, and 3/22 in Study 2), and 94% of participants
7 (30/32) said that they would be willing to enter a controlled study even if they had an equal chance
8 of being allocated to standard smoking cessation support rather than a physical activity intervention
9 group. Overall, these pilot studies suggest that an exercise intervention for smoking cessation in
10 pregnancy could prove an effective addition to usual behavioural treatment.

11 A randomised controlled trial comparing the effect of a physical activity intervention plus individual
12 behavioural support, versus individual behavioural support alone (usual care) on smoking cessation
13 among pregnant women was recently completed in the UK (Ussher et al., 2015). Participants
14 randomised to the intervention group received 14 sessions of supervised moderate-intensity
15 exercise over an 8-week period. Once a week, prior to eight of the supervised exercise sessions, the
16 women also received 15-20 minutes of physical activity counselling to increase physical activity
17 undertaken outside the supervised sessions. The trial recruited 789 pregnant smokers from the
18 general population in the UK. The trial found no difference between the physical activity
19 intervention group and the control group in rates of continuous abstinence at the end of pregnancy
20 (8% v 6%; odds ratio 1.21, 95% confidence interval 0.70 to 2.10). The authors concluded that
21 physical activity did not improve rates of smoking cessation, but that physical activity remains
22 indicated for general health benefits during pregnancy. However, this trial suffered from low
23 attendance at physical activity sessions (intervention group participants attended, on average, 4 of
24 the 14 sessions), which is consistent with many smoking cessation trials—the women who failed to
25 quit stopped attending.

26 However, these UK studies do not provide insight into the specific requirements and intervention
27 effects for Māori women. A systematic literature review, conducted in 2012, identified barriers and
28 facilitators to indigenous people's involvement in randomised controlled trials. Facilitators included
29 partnering with Māori communities, employing Māori staff, drawing on indigenous knowledge
30 models, using targeted recruitment techniques, and engaging indigenous people in the adaptation of
31 study materials to ensure they are culturally appropriate (Glover et al., 2015). In line with the
32 recommendations of this review, a Māori-centred intervention approach is required, which
33 incorporates a Māori world perspective. The aim of this study was to explore the acceptability of an
34 exercise based intervention to support cessation of smoking among Māori pregnant women by

1 engaging with key stakeholders, and by investigating Māori women’s attitudes to exercise during
2 pregnancy and preferred type and mode of delivery of a potential exercise programme. To the best
3 of our knowledge, there are no published studies of exercise programmes to aid smoking cessation
4 focussing on indigenous or minority pregnant women; although the Ussher et al study included
5 participants from ethnic minorities (Ussher et al., 2015).

6 Method

7 *Research design*

8 Te Whare Tapa Wha (the four-sided house), a Māori model of health (Durie, 1998), was used as the
9 theoretical underpinning for the study. Te Whare Tapa Wha is similar to ecological metaphors
10 (Nelson & Prilleltensky, 2005) in that individual health is understood to occur and result from the
11 holistic interdependent nature of te taha tinana (the physical realm, e.g. bodily health), te taha
12 hinengaro (the mental realm including thinking and emotions), te taha whānau (the wider family and
13 social context) and te taha wairua (the spiritual realm). Te ao tūroa (the effects of environmental
14 health and the socio-historical political environment) is a further realm impacting Māori health
15 (GLOVER, 2013). Social cognitive theory (Bandura, 1986) is a psycho-social theory influencing our
16 approach and is not inconsistent with the more holistic Māori model that brings in more factors.

17
18 Qualitative methods were employed for this exploratory study. Semi-structured interviews were
19 conducted with key informants by a trained Māori research assistant via telephone or face-to-face.
20 Focus groups with Māori pregnant women were conducted by MG, an experienced qualitative
21 researcher and focus group facilitator of Māori ethnicity. Key informants were leaders of Māori
22 community groups and Māori health providers and were contacted through the authors’ existing
23 networks. Pregnant Māori women who smoked were recruited via community organisations in
24 Auckland and Northland, New Zealand. Participants were eligible for the study if they self-identified
25 as Māori, were pregnant, were 18 years of age or over, were able to provide informed consent, and
26 were able to participate in an interview or group. Data collection occurred between March and July
27 2013.

28 Open-ended questions were used to allow for a reflexive discussion to take place and non-a priori
29 topics to surface. The discussion revolved around the foreseeable benefits of and barriers to
30 implementing an exercise programme for Māori pregnant women to aid smoking cessation. The
31 semi-structured interview schedule, which was used for both the key-informant interviews and focus
32 groups, is presented in Appendix 1. All focus group participants were reimbursed for the time spent
33 taking part in the focus group with a \$20 supermarket voucher.

1 Interviews and focus groups were digitally recorded and transcribed verbatim. Transcripts were
2 checked against the recordings for accuracy by two of the researchers (VR, MG). Both authors
3 regularly reviewed transcripts to determine when data saturation was reached (where no new
4 themes emerged from new participants) (Bernard, 2000). Responses from key-informants were
5 compared with responses from focus group participants to ascertain whether any differences in the
6 themes emerged between the two groups of participants.

7 Study procedures were approved by the University of Auckland Human Participants Ethics
8 Committee (Ref 8554).

9 *Analysis*

10 Data were entered in to NVivo9 software package to facilitate analysis to identify themes and
11 categories. A general inductive approach was followed (Thomas, 2006), which allows for unexpected
12 themes to emerge from the data. The inductive approach was chosen as it enables clear links to be
13 established between the data and the research objectives (Thomas, 2006). Peer debriefing of
14 potential codes and categories was conducted between authors as transcripts were read several
15 times. The coding process was iterative, which allowed categories to emerge and be continually
16 refined as broad themes began to appear. MG and a research assistant coded the entire sample
17 independently of each other. No discrepancies were found between the two coders. The categories
18 were then grouped into themes. A table was used to group quotes from different transcripts by
19 theme, and VR, MG, and the research assistant each reviewed the themes independently and
20 reached consensus on the categorization of data by theme. Towards the end of data collection no
21 new categories or themes emerged, suggesting saturation had been reached (Bernard, 2000).

22 Although the key-informants spoke more authoritatively than the focus group participants with
23 respect to the harms of smoking and the benefits of exercise as an aid for smoking cessation during
24 pregnancy, key-informants and focus group participants responded similarly to most questions. The
25 thematic analysis of the focus group findings and key informant interview findings yielded similar
26 results. Results for the key-informant interviews and focus groups were therefore analysed and
27 presented together. Instances where a theme arose among key-informants that did not arise among
28 focus group participants are noted.

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Results

Six key-informants were interviewed, and five focus groups of between 4-8 participants (n = 26) were conducted.

Overall, participants were supportive of the idea of a physical activity programme for pregnant Māori smokers to aid smoking cessation, and both key-informants and focus group participants felt that the programme could potentially be effective if designed appropriately and delivered in the right way. The principal, over-arching finding consistent across all participants was the critical need for a Kaupapa Māori approach (designed and run by Māori, for Māori people) for successful programme delivery, whereby Māori cultural values are respected and infused throughout all aspects of the programme. The importance of such a Māori-centric approach was illustrated throughout the discussions on the benefits and barriers of a group based exercise programme for Māori pregnant smokers. The analysis of the data produced eight themes, which can be grouped into two over-arching categories: Facilitators (factors that would support participation in an exercise programme) and barriers (factors that would undermine or prohibit participation).

A model, Ngā Piki me Ngā Heke - Te Ara Hapūtanga Ora (barriers and facilitators on the pathway to smokefree pregnancy) (Figure 1.) was developed to depict how programme adherence, exercise intensity and resulting behaviour change in the desired direction depends upon the interplay of the facilitators and barriers.

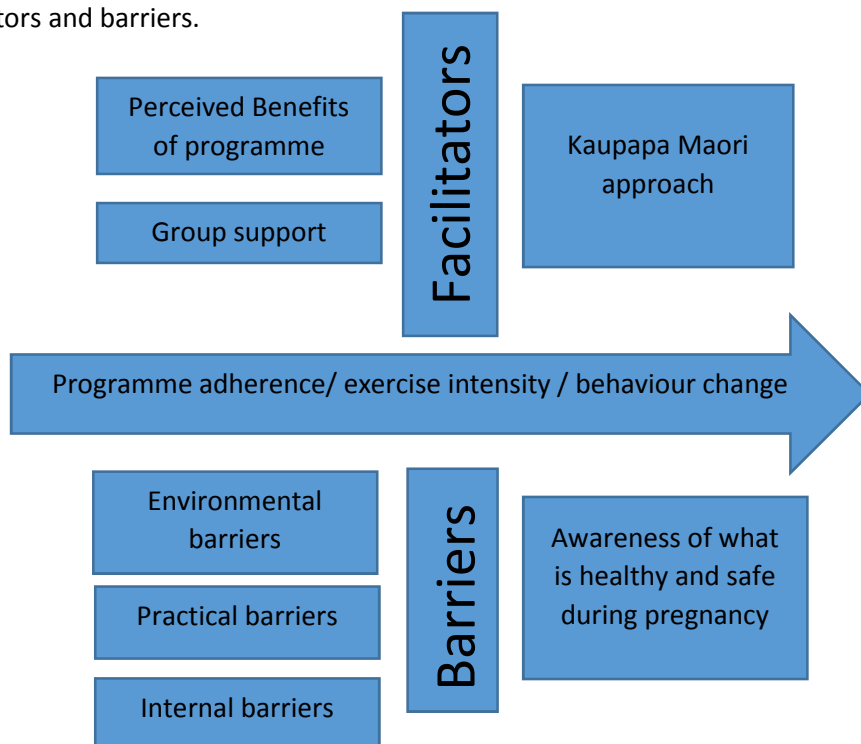


Figure 1: The Ngā Piki me Ngā Heke - Te Ara Hapūtanga Ora model

1 *Perceived benefits of exercise to aid smoking cessation for pregnant women*

2 Focus group and key informant participants discussed and identified many benefits of exercise in the
 3 context of trying to quit smoking (quotes are presented in Table 1). Some participants felt that
 4 exercise could help them quit by providing a distraction from cravings and the desire to smoke, and
 5 suggested that the endorphins generated during exercise would have a positive impact on one’s
 6 emotional state when trying to quit while pregnant. Additional health benefits of exercising while
 7 pregnant that were also emphasised by focus group participants included using exercise to help
 8 alleviate post-cessation weight gain, and helping them to stay healthier generally throughout their
 9 pregnancies, which was hoped would result in an easier birth. Participants were adamant that the
 10 exercise that would be encouraged by such a programme would need to be tailored for pregnancy
 11 and more specifically the stage of pregnancy for each woman.

12 Table 1. Perceived Benefits - Participant Quotes

<p><i>Benefits of exercise</i></p>	<p><i>...it’s a cure for depression, it can also be the cure for smoking. It gets you up and active, takes your mind off that dull thought and feeling, and desire for something that’s wrong for you. To actively do something that’s good for you, it just burns it out quickly.</i></p> <p><i>...it’s a positive thing having set rules or tasks or something every time you crave a smoke like go outside and do 10 star jumps.</i></p> <p><i>...especially when you’re pregnant and you’ve got little ones and soon as you’ve had kids you think ‘oh shit, I’m fat, I’m depressed, I’ve got no social life, nothing’ so having that exercise during the week will help you to feel better because you’ve got those endorphins kicking in to help you.</i></p> <p><i>I’d come, I think it would be so cool man. I’d love to be fit and have a more carefree birth.</i></p> <p><i>At the beginning of pregnancy, yeah, so you go do something, yeah really physical. But you wanna get, yeah when you get like 6 months or something I don't think so. It would have to be something low, but yeah yoga and that.</i></p>	<p><i>Focus Group Participants</i></p>
	<p><i>Some women are worried about putting on weight so exercise is a good idea.</i></p> <p><i>I think when you’re pregnant too the idea of having to go through the whole labouring side of it you probably want to be doing exercises that are going to help you birth better.</i></p>	<p><i>Key informants</i></p>
<p><i>Lack of Support</i></p>	<p><i>When I had my daughter I had no support. I just went back to smoking again. I cut down in the beginning and then, oh I stopped in the beginning and then I started when I was almost due to drop. And then after that I just went to what I normally smoke.</i></p>	<p><i>Focus Group participant</i></p>

	<p><i>There's no group based ones.</i></p> <p><i>There's no support network</i></p>	
Benefits of a group based programme	<p><i>If you've got mothers [taking part in the programme] then you've got a group in the same situation, they can identify with each other. Oh yeah that's you know that gives you more encouragement, you're not by yourself</i></p> <p><i>It's a time to get to know each other at that time. Whānaungatanga [genealogical connecting]</i></p>	Focus Group participants
Need for a Kaupapa Māori Approach	<p><i>It would be more beneficial doing group sessions. People sort of tend to feed off other people and support other people and I think when we're talking culturally - culturally it's in our nature to do things as a whole – as more than one. You know, and sometimes it can be a bit confrontational sort of having an individual coach telling you what to do whereas you can sort of build up your support network and again sort of going back to a marae- [community meeting grounds-] based, you know, and going back to whānau focus and whānau ora [family-focused holistic delivery model] values.</i></p> <p><i>In a collective setting often it's all the other stuff that goes along with it like the wairua [spiritual] stuff and doing things in an environment where there's whānaungatanga [genealogical connecting]. That's really important to support hapu [pregnant] mama with those sorts of things as opposed to them being in isolated settings where it's all up to you.</i></p> <p><i>I think as long as they're kaupapa Māori or they're by Māori for Māori approaches that will overcome many of the barriers.</i></p> <p><i>If we're talking about specific to Māori women, I think a Māori woman should definitely be doing the programme... I think if they've been taught by somebody who understands where you're coming from in terms of cultural or social or whatever they'll respond to that better and not necessarily just Māori women, maybe Māori men as well if they're qualified to do it obviously.</i></p> <p><i>Experts would be really good, but they need to be really supportive as well. Like they don't like people who just stand up and throw things at them and judge them because they're doing this and that, you know. I notice I work better with people who support what you're doing, but give you another way to go round things.</i></p> <p><i>I also think that some women know that smoking's not good for them and that smoking is not good for their baby so they do feel a little bit whakamaa [shy, shame] about that so it's kind of around how they can be supported and encouraged to participate when they know that it's bad. So it's around how they can be supported along that pathway too.</i></p>	Key-informants

	<p><i>Take the whole concept, if we are going to do raranga [weaving] and Kapa Haka [Māori song and action performing] we should try and fit the exercises whether they be mental or physical into each category so that person does go with a better outlook towards smoking instead of only building on two walls of their whare [house] towards smoking.</i></p>	
	<p><i>That's a good one, connecting with your maunga [mountain] too.</i></p> <p><i>You know, being Māori, I'd like Māori to do it.</i></p> <p><i>This is for our Māori people issue at the moment. It should be Māori</i></p>	<p><i>Focus Group participant</i></p>

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2 *The supportive benefits of a group based programme*

3 Participants were overwhelmingly supportive of a group-based programme as opposed to an
4 individual focused exercise programme (quotes are presented in Table 1). The challenges of not only
5 being pregnant, but quitting smoking and trying to exercise were highlighted by many participants
6 who emphasised that having the support from others going through a similar process would be
7 beneficial. Focus group participants suggested they had experienced or perceived a lack of support
8 in the past, and they felt that a group-based physical activity programme may fill the perceived gap
9 in their own support structures, and in services currently on offer.

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11 *A good cultural fit, a Kaupapa Māori based approach*

12 Related to the perceived benefits of having a group based programme, participants, particularly the
13 key-informants, expressed that group based interventions are appropriate for Māori due to the
14 collective nature of Māori culture. Key-informants suggested that individuals may be more likely to
15 be motivated to change behaviour within a group setting as it could be less confrontational. All
16 participants expressed a strong interest for the programme to incorporate a focus on being Māori,
17 Māori traditions, and connecting with ancestral knowledge. Combining activities with education
18 around the Māori history of the surrounding environment, and increasing understanding of the
19 physical activities that pre-European Māori participated in and their reasons for doing so, were seen
20 as important elements that should be included in an exercise programme for Māori.

21 Participants were unanimous that an exercise programme for Māori should be delivered by Māori (a
22 Kaupapa Māori approach). Participants suggested that non-Māori professionals could be called upon
23 to fill a gap in the resources where necessary, but as much as possible the programme should be
24 delivered by Māori, with the facilitators of the programme to take a supportive, non-judgmental

1 approach to delivering the programme and educating women about smoking. A supportive approach
 2 was considered imperative because participants noted that Māori women were unlikely to come
 3 back to a programme where they felt like they were being judged for smoking while pregnant or
 4 experienced whakamaa (a Māori feeling that includes shame).

5 One participant talked in terms of including exercises that nurture different realms of Te Whare Tapa
 6 Wha, that is, exercises that not only have physical benefits, but also incorporate mental, spiritual,
 7 and whanau aspects. Connecting with one’s maunga (ancestrally important mountain) would
 8 nurture te taha wairua, their spiritual side, and was a common suggestion among all participants.

9 *Environmental*

10 A number of environmental barriers were mentioned that participants felt could impact on the
 11 success of the programme. The environmental context in which Māori women live was highlighted
 12 as potentially having a big negative impact on the programme, both in terms of the practicalities of
 13 attending an exercise programme, and the practicalities of trying to quit smoking given the high
 14 prevalence of cigarette smoking in the environments in which they live.

15 A number of concerns were raised around the difficulties the participants had faced trying to quit
 16 smoking in the past, given their living situation. Many participants commented that quitting smoking
 17 on one’s own was always difficult when the rest of the household smokes. Some mentioned that
 18 smoking is very engrained within the culture, so smoking during pregnancy is commonplace. A few
 19 participants suggested that bringing the whānau on board and encouraging everyone to quit for the
 20 sake of baby’s health would be unlikely to work. Such interventions would require the whole
 21 whānau engaging with the programme, and participants felt it would be difficult to motivate other
 22 members of the whānau to quit smoking or attend an exercise programme.

23 Table 2: Barriers – Participant quotes

<i>Environmental barriers</i>	<p><i>Obviously everyone’s got other things that are happening and those can [im]pinge on people’s ability to follow through on a particular issue and we know our whānau have got lots of other issues like poverty, and unemployment and housing costs and all of those things can impact on people’s ability to follow through on these kaupapa [agendas] so that’s really important as well.</i></p> <p><i>Adherence, well I mean we can’t discount the fact that the wider environment impacts quite a lot on a woman’s smoking: where she lives, the family – who else in the household is a smoker, is the partner a smoker? You know that sort of environment.</i></p>	<i>Key informants</i>
	<i>Everyone smokes so it’s going to be hard. Most people you</i>	<i>Focus Group</i>

	<p><i>can target the one person who's pregnant to give up smoking but then you got to think who's in the house and they're all smoking and it's going to be hard for that person to always smell it, always see it and to try and resist it. It's going to be hard.</i></p> <p><i>I smoked right through pregnancy. We'll have to target homes not one person cause you got to think about the rest of the people in the house cause one person will give up but then there's always the thought of 'oh yeah I can just have one ciggy, it's only one'. Then that one will turn into another two and then it just keeps building on because everyone else is, or even if they smoke outside when they walk in they smell - the person will smell like cigarette and then you just can't resist it.</i></p>	<p><i>participant</i></p>
<p><i>Practical barriers</i></p>	<p><i>Some people can't even afford to go to a gym, they'd rather pay to watch something - like they do those little commercials on ads and they're working out and you can just be sitting there doing a workout instead of paying some money to go and do some.</i></p> <p><i>I mean if it falls in a place where, like, I've gotta take one of the kids somewhere to something they have then that comes first.</i></p> <p><i>This is baby number five so my other four children are the exercise. It is hard to work around that.</i></p> <p><i>That holds people back aye? If they can't cater for their tamariki [children] they're not gonna go.</i></p> <p><i>Even with me with my first child I still waited till I was 5 months before I told my [parents]... I'm old enough too, I'm my own person I'm an adult but still it's just like they're going to growl me. You know it's that thought oh they're going to growl me but that's why you don't find them [Māori pregnant women in the early stages of pregnancy]</i></p>	<p><i>Focus Group participants</i></p>
	<p><i>So most hapu women either don't know that they're hapu in that first trimester or ... they know they're hapu but they don't go and officially find it out.</i></p> <p><i>And can they afford it? Like are they gonna be... that's the other thing too. Is there gonna be a charge for it? And we know that sometimes doesn't make a difference because we don't charge for our services, it's free but we still have difficulty getting them in.</i></p> <p><i>Mainly just getting our young women to the venue is mainly issue and probably the change of cell phone numbers. Our young ones tend to change their cell phone numbers quite</i></p>	<p><i>Key-informants</i></p>

	<i>frequently.</i>	
<i>Internal barriers</i>	<p><i>Like I think you're going to have problems getting the women there for a start, getting them motivated to go there and keeping them there and there's lots of reasons for that.</i></p> <p><i>I know when I was pregnant I didn't want to exercise at all which is completely foreign in my world to me but I didn't exercise my entire pregnancy, I didn't want to. I had no inclination to want to be sweaty and yuck, which is odd for me. I mean my whole life I've competed and trained.</i></p>	<i>Key-informant</i>
	<p><i>It all depends really because it's all up to the person if they really want to give up the smoke. Sometimes when people do want to give up the smoke they'll do it for their baby but it comes down to their might – are they strong enough to do it.</i></p> <p><i>I feel like I can give up cigarettes once baby's here. Only because my time will be taken and I won't have much time to go out. I have to come back in and take off all my clothes that stink of smoke.</i></p> <p><i>When I've got no smokes I feel like I don't want to do nothing, without a smoke. I think I'm just used to smoking. When I've got smokes I can stop, I can think, I can do things. But when I've got no smokes I just want to stay in bed and sleep all day.</i></p>	<i>Focus Group participants</i>
<i>What's safe during pregnancy?</i>	<p><i>But even if smoking during your pregnancy doesn't affect your child, it adds onto future problems that you or your child may have.</i></p> <p><i>Your body's like a sieve and what you take in, all the nutrients and the nourishment goes straight to the baby... so the main poisons and no nutrients in the smoke the baby's sucking it all up and you're getting the leftovers of it. That's why you just want some more, because you're not getting the hit. The baby's stealing your buzz.</i></p> <p><i>Can't have that when you're pregnant - those nicotine patches and the gum and stuff. You can't take them because it says not for pregnant or breastfeeding mothers. So you know you're just going to have to go cold turkey which is hard.</i></p>	<i>Focus Group participant</i>

1

2 *Practical barriers*

3 A number of practical barriers to attendance were noted, including: cost, the timing of the
4 programme, accessibility, transport, and childcare considerations. Attending an exercise programme
5 would be a secondary priority to family commitments and children's activities, and would need to fit
6 in around everything else going on in their lives. If it didn't fit within their kids' schedule, they
7 wouldn't attend. The time of day the programme is offered would influence whether women would

1 be able to attend. A few participants noted that attendance depended on a family vehicle and they
2 would need to arrange to use a family vehicle at a time when the vehicle was not otherwise being
3 used. They also indicated that such participants may not want to pay for petrol, nor the programme
4 itself. Focus group participants were overwhelmingly of the opinion that women wouldn't attend if
5 they had to pay for the programme. Moreover, one key-informant indicated that even if health
6 services and programmes are free, uptake is often hindered by the fact that many pregnant women
7 have other young children to care for, which also restricts their ability to attend such programmes.

8 Timing of presentation to health services for pregnancy was also identified as a potential practical
9 barrier to accessing such a programme. Late confirmation of pregnancy meant that it would be hard
10 to enrol pregnant women in their first trimester. Both focus group participants and the key-
11 informants perceived that Māori women do not present until well into their second trimester. Some
12 explained that this delay in presenting is because many women do not know they are pregnant until
13 they are in the second trimester.

14 *Internal barriers*

15 In addition to the many environmental barriers presented above, participants raised a number of
16 internal barriers that would need to be addressed for the programme to be successful. Such internal
17 barriers included negative past experiences of exercising, past failed attempts to quit, and lack of
18 motivation.

19 Motivation to exercise was effected by changes that come with pregnancy, for example, one woman
20 went from being an active person to not wanting to exercise at all. Besides low motivation to
21 exercise, motivation to quit smoking could be low. One woman was putting off quitting believing
22 that she would have an easier time quitting after she'd had baby because she wouldn't have time to
23 smoke and she thought she had to change her clothes after having a smoke. The negative affect
24 associated with nicotine withdrawal symptoms was also described by some focus group participants
25 as having an impact on motivation to quit.

26 *Awareness of what is healthy and safe during pregnancy*

27 Knowledge about appropriate exercise intensity while pregnant varied across participants. Some
28 participants commented that the exercise needed to be 'low impact' and some participants
29 mentioned that exercise suggestions such as Zumba or kick boxing were '*too intense*' for pregnant
30 women to participate in. Some participants were adamant that sports such as Netball or Touch
31 Rugby were '*too physical*' and that one could endanger the baby by partaking in them.

32 Beliefs about the benefits of exercise while pregnant, the benefits of exercise for smoking cessation,
33 the harm of smoking during pregnancy, the use of NRT during pregnancy, and what is healthy during

1 pregnancy, were diverse. One focus group participant mentioned that as a smoker she felt fitter
2 than some of the non-smokers she associated with.

3 The knowledge or acceptance of the harms of smoking while pregnant among the focus group
4 participants ranged from woefully lacking to fairly well-informed. One participant suggested that
5 smoking during pregnancy may not have any negative health impact on the baby, whilst others were
6 of the opinion that as long as they stopped smoking during pregnancy they could start smoking again
7 as soon as they gave birth.

8 Participants demonstrated a lack of understanding of how smoke inhaled into the lungs is broken
9 down and metabolised and how the toxins are transferred to the baby. One woman spoke about
10 stronger cravings, which can occur in some pregnant women, and felt that her baby was taking in all
11 the 'poisons' and leaving her with 'the leftovers'.

12 Another misconception among some of the focus group participants was that having a low birth
13 weight baby was a good thing, however they correctly knew that smoking did increase the risk of
14 having a low birth weight baby. Participants also demonstrated mixed knowledge about the
15 usefulness or risks of using NRT during pregnancy.

16

17 *Suggestions of what the program should consist of*

18 Both key informants and focus group participants offered a number of suggestions as to how the
19 programme could be conducted, and how to increase the attractiveness of the programme. One
20 consistent theme was that there needed to be a range of options to choose from, and varied content
21 to keep the participants interested and engaged.

22 *'...whatever suits women's lives. Whether it be in the community, whether it be on the marae*
23 *[meeting grounds], whether it be on maunga [mountain] or any other environment. –Key-informant*

24 Participants were in favour of programme participants having choice as to the activities they could
25 partake in. Both key-informants and focus group participants thought that a variety of different
26 activities should be incorporated, both to satisfy individual preferences and to keep the programme
27 interesting. Some of the exercise options suggested included: *'walking up and down stairs. Just a lot*
28 *of pelvic, opening pelvic muscles and all that kind of exercise', 'yoga and meditation', 'tai chi', 'water*
29 *walking', 'getting out in nature', 'breathing exercises', 'kapa haka', 'swimming, 'pilates', 'walking up*
30 *and down maunga', 'walking', 'waka ama' [canoeing], traditional Māori games like 'Mau rākau', 'Mū*
31 *Tōrere', 'Ki-o-rahi and Tapuwae' and 'walking for the whānaungatanga that happens when you're*
32 *out walking in the fresh air, just conversations that you have would be absolutely ideal'. Other*

1 suggestions included 'zumba' and 'kickboxing' but whilst some participants felt these exercise
2 modalities would be appropriate exercises to partake in whilst pregnant, others considered them to
3 be 'too physical' and suggested that all exercises needed to be 'low impact'.

4 Participants were unanimous that to be attractive to Māori pregnant women, the programme needs
5 to be easily accessible and ideally free, as some women wouldn't be able to participate unless they
6 were picked up and transported to the programme. A low-cost alternative would be to provide
7 exercises for women to do around their house and to have them meet up close to home. Childcare
8 might be needed to enable mothers to attend or alternatively the mothers taking part could take
9 turns looking after the children while the exercise class was conducted, rotating in and out of the
10 class.

11 *'It'd be good if they had a vehicle ...Pick them up, take them all together to whatever they want to*
12 *do.'* –Key-informant

13 *'Around the house, around the neighbourhood, in local parks. I would think places that are a little bit*
14 *more low cost given the target audience.'* –Key-informant

15 *'If you do do a programme you could start up a little childcare because when you rotate you're*
16 *getting ready for a baby; you're gonna have to learn about it somehow or you already got kids.'* -
17 *Focus Group participant*

18 Consistent with a kaupapa Māori approach, participants suggested that the programme needed to
19 be holistic and not just about exercise. For instance, the programme should increase knowledge
20 around pregnancy and health, discuss topics such as nutrition during pregnancy, the effects of
21 smoking during pregnancy, the effects of alcohol during pregnancy, and what is safe to partake in
22 whilst pregnant.

23 *Yeah. the whole Whare Tapa Wha concept; incorporating that into everything. If you're going to do*
24 *the whole self-esteem thing and the exercise thing why not incorporate the rest of Whare Tapa Wha'*
25 *- Focus Group participant*

26 Discussion

27 The study sought to examine the acceptability of designing an exercise based intervention to
28 support cessation among Māori pregnant women by engaging with key stakeholders and Māori
29 women. Overall, findings demonstrated positivity towards the concept of an exercise-focused
30 cessation programme for Māori pregnant women; however, the social determinants of smoking and
31 the constraints imposed by social and financial disadvantage could present too many practical

1 barriers to make such a programme pragmatic. Exercise/cessation interventions for pregnant Māori
2 women that smoke should start from a kaupapa Māori base: that is, that they are designed by Māori
3 for Māori, that Māori holistic health beliefs are central and that activities are understood to deliver
4 holistic benefits not just physical ones. Thus, an 'exercise' program designed by Māori would likely
5 include information to raise awareness and knowledge of the broader topics of relevance for
6 pregnant women: harms of smoking while pregnant, pregnancy health, and optimising nutrition
7 while pregnant.

8

9 To strengthen the attractiveness of the programme, it needs to deliver information of value to the
10 women in addition to information that health professionals might see as valuable. Inherent in a
11 kaupapa Māori approach is an emancipatory(Smith, 1999) objective which for Māori supports tino
12 rangatiratanga (sovereignty) and decolonisation. The participants thought that an exercise to quit
13 programme should include knowledge of ancestral Māori practices and historical Māori stories
14 about local environments. Teaching the programme participants traditional Māori games and
15 activities that were traditionally used to develop dexterity, fitness, and strength, and that were used
16 to pass on traditional Māori knowledge and practices would be extremely attractive even to young
17 urban Māori women who may have had little inter-generational Māori knowledge shared with them.
18 Within the context of a kaupapa Māori exercise to quit programme, contemporary exercise such as
19 Zumba could be included. The participants in this study stressed the need to present a wide choice
20 of activities, to recognise individual diversity of pregnancy experience, and provide for different
21 levels of intensity of exercise.

22

23 Accessibility to the programme is important, though secondary to who delivers the programme.
24 Within a kaupapa Māori framework, the programme should be free or of very low cost to
25 participants, with a range of activities delivered at a range of days and times, across a range of
26 venues or even parks and visits to local sites or mountains. The programme would need to be locally
27 based, and childcare options need to be incorporated within the programme.

28

29 A kaupapa Māori approach would centre Māori values of aroha (love) and manaaki (caring for)
30 which reduce negative judgements and stigmatisation of pregnant women who smoke, and is likely
31 to be experienced as more supportive (Glover, Kira, & Smith, 2015).

32

33 In respect to the objectives of this study, we determined what would be perceived to be a culturally
34 appropriate approach to deliver an exercise programme to Māori pregnant women to aid smoking

1 cessation. The participants provided rich information on the preferred composition of the exercise
2 component of the intervention, and how to maximise the attractiveness to recruit Māori pregnant
3 women for such a programme.

4 The perspectives of participants and potential barriers to attendance identified in this study are
5 consistent with the findings from the trial by Ussher et al. (2015). Ussher et al. (2015) reported that
6 many of the participants were from low income communities where walking was their primary form
7 of transport, which is important for two reasons – 1) participants were already experiencing the
8 benefits of exercise, and 2) participants may have had difficulty getting to the sessions.
9 Notwithstanding all of the above, as Ussher et al. (2015) also note, attempting to change two
10 behaviours (smoking cessation and exercise participation) at once whilst also going through
11 pregnancy, is potentially too overwhelming and unrealistic for most pregnant women. Barriers to
12 participation such as low income, transport, stigma associated with smoking whilst pregnant (as
13 indicated by participants' reluctance to continue to attend the programme after relapsing), and the
14 fact that it may be unrealistic to attempt to change two behaviours at once, were apparent in both
15 studies.

16 However, Ussher et al. (2015) concluded that despite their null finding, physical activity does have
17 significant health benefits and that physical activity participation in pregnancy should be
18 encouraged. A kaupapa Māori physical activity programme that incorporates a holistic approach
19 focused on improving all aspects of health, rather than a specific focus on smoking cessation in
20 pregnancy, may bring about a more significant improvement in health for women and their baby.
21 Our recommendation would be to include in such a programme all women who self-identify as
22 Māori, aged 16 and over, and at any stage of their pregnancy, irrespective of smoking status.

23 Limitations and Strengths

24 This study was a small qualitative study with Māori women conducted in Auckland thus the results
25 may not be generalizable to Māori or Indigenous people from rural or other areas or countries. The
26 in-depth information was a strength and could be used to guide the development of a kaupapa
27 Māori exercise to quit programme.

28 Conclusion

29 A Māori based and delivered exercise programme to support abstinence from smoking while
30 pregnant among Māori women was an acceptable concept. However, significant barriers to the
31 practical implementation such as ensuring attendance could prove prohibitive. Further feasibility

1 research is needed to design and test a programme as suggested by the results of this study with
2 design effort paid to minimising barriers to attendance.

3

4

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7

1 Appendix 1: Semi-structured focus group/key-informant interview discussion schedule

2

3 We are interested in your thoughts around an exercise programme for pregnant Maori women to
4 help address smoking rates in this population group. We want to determine the most appropriate
5 approach for delivery of such a programme.

6

7 What are your initial thoughts about the idea of a physical activity programme to help reduce
8 smoking rates among pregnant Maori women?

9 Prompts: Is it a good idea? Why? Why not?

10 Do you have any concerns/fears around exercising whilst pregnant that would need
11 to be addressed before participating in a physical activity programme? What might
12 these be?

13 Do you do any exercise at the moment?

14

15 If we assume that it is safe and even beneficial for both mother and baby to exercise whilst
16 pregnant, how would you like to see a physical programme like this delivered?

17 Prompts: What is the best way to deliver an exercise programme during pregnancy?

18 Who should deliver it? What types of exercise would you consider to be good for

19 Maori women during pregnancy? Where would you suggest that these exercises

20 take place? Should they be individual or group-based programmes? Should they be

21 supervised or unsupervised programmes?

22

23 If we were to conduct a study to look at the effectiveness of a physical activity programme in
24 pregnant

25 Maori women to reduce smoking rates:

26 What do you think of this idea?

27 Is this something you would consider?

28 What, if anything, would stop you from participating?

29

30 Is there anything else (apart from physical exercise, and stop smoking support) that you would like
31 to see included in the programme?

32

33 Do you foresee any barriers to the acceptability of the intervention/participation in the
34 intervention?

35

- 1 How would you suggest we overcome these barriers?
- 2
- 3 In order to maximise health outcomes we are hoping to recruit women in the early stages of
- 4 pregnancy (the first 1-13 weeks). What would you suggest would be the best approach to recruit
- 5 participants during the first 1-13 weeks of pregnancy?
- 6 Do you have any other comments?